

REMARKS

Claims 1, 2 and 4 remain pending in the application.

Claim Amendments

Claim 1 is amended to state that the claimed method "consists essentially of" the recited components. Component (B-1) is amended to be defined as an organoaluminum compound having reducing ability. Support for this amendment resides at page 38, lines 17-18 of the specification. No new matter is added by this amendment.

Rejection under 35 USC 102(a)

Claims 1-3 stand rejected under 35 USC 102(a) as being anticipated by JP 11-199592. This rejection respectfully is traversed to the extent deemed to apply to the claims as amended.

The cited reference discloses a transition metal compound A of formula I (as defined) and a catalyst comprising

(A) the compound of formula I

(B) at least one of a compound selected from

(B-1) an organometal compound,

(B-2) an organoaluminum oxy-compound, and

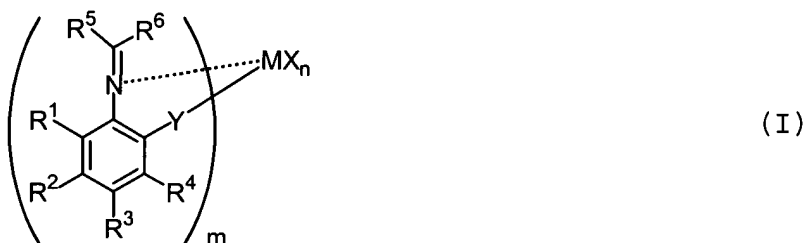
(B-3) a compound which reacts with the transition metal compound (A) to form an ion pair, and

(C) a carrier.

The above compounds will hereafter be referred to as (a), (b-1), (b-2), and (b-3) to avoid confusion with the recited components in applicants' claimed compound.

Applicants' claimed invention is directed to a polymerization process which occurs at a temperature of 50 to 200 °C by use of a polymerization catalyst consisting essentially of

- (A) a transition metal compound represented by the following formula (I),



- (B-1) an organoaluminum compound having reducing ability which reacts with the transition metal

compound (A) to convert an imine structure moiety to a metal amide structure, and

- (B-2) a compound which reacts with the transition metal compound (A) to form an ion pair.

Thus, in the claimed invention, the particular combination of the compounds (B-1) and (B-2) together with the transition metal compound (A) of the formula (I) is recited.

The reference discloses a broad range of catalyst compounds, but does not in any way teach or suggest the specific combination

of compounds (B-1) and (B-2), together with the selected transition metal compound (A), as defined in applicants' claim 1.

More specifically, the claimed compound (B-1) in the catalyst is distinguishable from the catalyst compounds of the cited reference, since compound (B-1) is used together with compound (B-2).

As previously argued, the reference discloses various combinations of the catalyst compounds, but when the reference uses compound (b-3) (which corresponds to applicants' claimed compound (B-2)), only the following combinations are taught:

- (1) none of both (b-1) and (b-2)/(b-3)
- (2) (b-1) (organometal compound)/(b-3)
- (3) (b-2) (organoaluminum oxy-compound)/(b-3)
- (4) (b-1)/(b-2)/(b-3)

Of the above combinations, (1), (3) and (4) are not relevant to the specific combination (B-1) and (B-2) claimed by applicants because compound (B-1) of the invention excludes the organoaluminum oxy-compound used in the reference. However, the combination of the compounds of the reference (b-1) and (b-3) as in combination (2) above is identical to the specific combination of (B-1) and (B-2) of applicants' claimed compounds.

However, it should be noted that Example 5 of the reference teaches a compound C-3 used as transition metal compound (A), triisobutyl aluminum ($i\text{Bu}_3\text{Al}$, TIBA) is used as organoaluminum compound (B-1), and triphenylcarbeniumtetrakis(pentafluorophenyl)

borate is used as a compound forming ion pair. However, compound (C-3) is outside the scope of the claimed invention.

By use of the specific catalyst system used in the claimed process, an olefin polymer can be produced which has a dramatically high polymerization activity at high temperatures (50 °C or higher) as defined in claim 4. Such unexpected results are demonstrated in applicants' examples.

Again, compound (C-3) having an Ni-S bond is used as the transition metal compound (A) and $i\text{Bu}_3\text{Al}$ is used as the organometal compound (B-1) in Example 5 of the reference. The reason for the use of $i\text{Bu}_3\text{Al}$ in the examples of the reference is not due to any expected reduction activity, but it is common knowledge to use trialkyl aluminum when a compound having a transition metal-halogen bond is present such as in compound C-3.

A copy of page 1414 of *Chem. Rev.* 2000, 1391-1434 is attached to confirm this teaching of the prior art.

Taking the teachings of Example 5 as well as the remaining teachings of the reference into account, it is clear that attaining a significantly high polymerization activity at high temperature by use of a polymerization catalyst having a compound forming an ion-pair (B-3) in combination only with a compound having a C=N bond selected from transition metal compounds (A) and only with an organoaluminum compound having reduction ability selected from organometal compounds (B-1) is quite difficult.

The cited reference does not teach or suggest the claimed polymerization process using the specifically recited catalyst.

The claimed invention is thus not anticipated by the claimed invention.

In order to assist in distinguishing over the teachings of the reference, claim 1 is amended to state that the catalyst used in the claimed method "consists essentially of" the recited components. This is in response to the Examiner's statement in the Official Action that the term "comprising" was not sufficiently limiting to distinguish over the reference.

Further, applicants submit herewith a Declaration under 37 CFR 1.132 which demonstrates the advantages attained by the claimed method.

More specifically, experiment A was carried out in the same manner as in Example 5 of the cited reference, except that the polymerization temperature was raised from 25°C to 50°C.

Experiment A shows that the polymerization activity was 36.8g-PE/mmol-V·hr, and thus the polymerization does not proceed at all due to the fact that the transition metal compound (A) does not satisfy the requirement of having an N=C bond as recited in claim 1.

In addition, a comparison between Example 1 and Comparative Example 3 clearly shows that the polymerization does not proceed in the case wherein the organoaluminum compound (B-1) is trimethylaluminum which does not exhibit the requisite reducing ability to convert the amine moiety to a metal amide.

The Examiner's attention is directed to the results of Example 5 of the reference, additional Experiment A, Example 1 of

the present invention, and Comparative Example 3 summarized in the following table:

	Temp. (°C)	Time (hr)	(A) transition metal compound (mmol)	(B-1) organo- aluminum compound (mmol)	(B-2) compound forming ion pair (mmol)	Polyme- rization activity g-PE/mmol-M · hr
Ex.5 of JP'592	25	1.0	(C-3) (N-Si bond) :0.005	TIBA:0.25	Tr-B:0.006	12
Exp.A	50	1.0	ditto	ditto	ditto	36.8
Ex.1 (inven- tion)	50	0.5	(C-1) (N=C bond) :0.005	ditto	ditto	1405
Comp. Ex.3	50	0.5	ditto	Trimethyl- Aluminum :0.25	ditto	107

As is apparent from the table, only the claimed combination of species (A), (B-1) and (B-2) demonstrate the desired high polymerization activity, which is orders of magnitude higher than the comparison examples.

Thus, while the Examiner takes the position that applicants' invention can be derived from the "best" combinations of the disclosed combinations, applicants have demonstrated that the "best" combination of components is not the result of an obvious choice, but is instead the result of an unobvious choice.

In summary, no teaching resides in the cited reference which would lead one of ordinary skill in the art to the use of a

catalyst containing the component (B-1) having reducing ability selected from the group consisting of organometal compounds (b-1) of the reference, in combination with components (B-2) and the transition metal component (A), with the resulting effectiveness on polymerization activity at high temperature being attained.

In view of the above, it is submitted that the claimed invention is not anticipated by the cited reference, and the rejection should be withdrawn.

Claim 4 stands rejected under 35 USC 103(a) as being unpatentable over JP 11-199592. This rejection respectfully is traversed to the extent deemed to apply to the claims as amended.

The deficiencies of the cited reference are discussed at length above. In view of such deficiencies, the rejection is without basis and should be withdrawn.

The application is accordingly believed to be in condition for allowance.

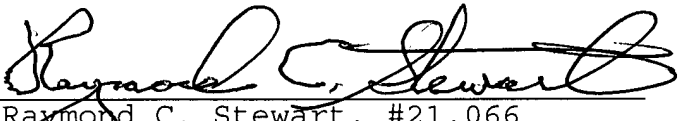
Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a one (1) month extension of time for filing a reply in connection with the present application, and the required fee of \$110.00 is attached hereto.


Application No. 10/009,738

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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1155-0234P

Attachment: Declaration under 37 CFR 1.132
Literature article